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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of) LEROUX ET AL.
Title) EXTERNALLY GLAZED ARTICLE
Serial Number) 09/758,741
Filing Date) January 11, 2001
Art Unit) 1775
Examiner) Dicus, T.
Attorney Docket No.) 1366

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APPEAL BRIEF OF APPLICANT UNDER 37 C.F.R. § 1.192

To: Commissioner for Patents
Mail Stop Appeal Brief - Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In response to the Office Action mailed December 12, 2003, Applicants filed a Notice of Appeal on March 3, 2004. Enclosed is an Appeal Brief, in triplicate, in support of the Applicants position.

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APPEAL BRIEF

IN SUPPORT OF U.S. SERIAL NO. 09/758,741

1. REAL PARTY IN INTEREST

Vesuvius Crucible Company

103 Foulk Road, Suite 32

Wilmington, DE 19803.

Vesuvius Crucible Company obtained worldwide rights in the invention by assignment from the inventors, who are employees of a subsidiary company.

2. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

3. STATUS OF CLAIMS

The Examiner has rejected all pending claims of the application, that is, claims 1-6 and 19-24.

Claim 1 was an original claim previously amended.

Claims 2-6 are original.

Claims 7-18 are canceled.

Claims 19-24 are new as of a November 7, 2003 RCE.

4. STATUS OF AMENDMENTS

No amendments have been made since the December 12, 2003 rejection.

5. SUMMARY OF INVENTION

Prior art, as shown in figure 2, teaches a carbon-containing refractory article (1) coated with a glaze (8) and covered by an insulating coating (7). The inventors had discovered that this configuration resulted in pin-holing and delamination of the glaze (7) from the article (1), as shown in figure 3.

Figure 4 shows one embodiment of the invention, which describes a refractory article comprising a carbon-containing refractory article (1) with an insulating coating (8) substantially covering an outer surface, and a glaze (7) covering at least a portion of the insulating coating.

Sandwiching the insulating coating between the refractory article and the glaze reduces or eliminates pin-holing and delamination, thereby reducing oxidation of the carbon-containing article. See paragraph 30, US 2002/0090514.

6. ISSUES

1. Did the Examiner properly reject claims 1-3, 6 and 24 under § 102(b) in light of US 5,691,061 to Hanse?
2. Did the Examiner properly reject claims 1-2, 6 and 24 under § 102(b) in light of US 5,370,370 to Benson?
3. Did the Examiner properly reject claims 1 and 24 under § 102(b) in light of US 5,908,577 to Yamamura?
4. Did the Examiner properly reject claim under § 103(b) in light of US 6,380,114 to Brandy in combination with any one of Hanse, Benson, or Yamamura?

5. Did the Examiner properly reject claims 19-23 under § 103(b) in light of Benson in combination with Brandy?

6. May the Examiner reject claim 4 absent any citation or references against the claim?

7. GROUPING OF CLAIMS – CONTESTED GROUNDS OF REJECTION

1. § 102(b) Rejection in light of US 5,691,061 to Hanse:

Claim 1 shall represent claims 2-3, 6 and 24.

2. § 102(b) Rejection in light of US 5,370,370 to Benson:

Claim 1 shall represent claims 2, 6 and 24.

3. § 102(b) Rejection in light of US 5,908,577 to Yamamura:

Claim 1 shall represent claim 24.

4. § 103(b) Rejection in light of US 6,380,114 to Brandy in combination with any one of Hanse, Benson, or Yamamura:

Claim 5 is the only rejected claim.

5. § 103(b) Rejection in light of Benson in combination with Brandy:

Claim 19 shall represent claims 19-23.

6. Rejection lacking citation or references:

Claim 4 is the only “rejected” claim.

8. ARGUMENT

The Examiner has issued seven actions in the present application, including two requirements for restriction, three non-final office actions, and two final office actions. A first restriction requirement demanded restriction of dependent claims. The Examiner withdrew her first restriction after a telephonic interview with Applicants. Substantive examination led to a first final rejection. After a personal interview by Applicants, the Supervising Examiner ordered a new search and withdrawal of the final rejection. An RCE followed a second final office action, and a non-final rejection after the RCE prompted this appeal.

Applicants believe the Examiner has acted as her own lexicographer in defining certain key terms of the pending application, such as “insulating coating.” Applicants also believe the Examiner has impermissibly shifted the burden of proof to Applicants. She has, in effect, asked Applicants to prove a negative. Applicants believe the Examiner has cited references that fail to teach or suggest the combination of elements found in the present application. Finally, the Examiner has rejected a claim without citing any references or making any arguments against patentability.

SECTION 102 REJECTIONS

1. Hanse

The Examiner has rejected claim 1 as anticipated by US 5,691,061 to Hanse. Anticipation may exist where a single reference teaches, either expressly or inherently, each and every claimed element as interpreted by one of ordinary skill in the art. See, e.g., *W.L. Gore & Assoc. v. Garlock*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Further, each element must be “arranged as in the

claim.” *Lindermann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing *Connel v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983). “[A]ny degree of physical difference, however slight, invalidates claims of anticipation.” *Ultradent Products Inc. v. Life-Like Cosmetics Inc.*, 39 USPQ2d 1969, 1980 (Utah 1996).

Hanse teaches a refractory article having a bore defined by a carbon-free liner. Figure 1 of Hanse shows a typical submerged entry nozzle, including a refractory piece (2), slag-line sleeve (8), and liner (10). The slag-line sleeve covers only a portion of the outer surface where the nozzle is adapted to contact slag. A glaze (3) is applied to the outer surface of the nozzle including the slag-line sleeve. Applicants do not understand the Examiner’s reason for rejection based on Hanse. A slag-line sleeve is not an insulating coating within the meaning of the present application and does not substantially cover the outer surface.

Slag-line sleeves are typically erosion-resistant refractory rings, which are mortared or copressed around or into a nozzle. See, e.g., EP 1,144,145 (describing copressing a slag-line sleeve within the body of a nozzle). The Examiner apparently believes any substance, including a slag-line sleeve, is an insulating coating. Taking the Examiner’s argument to the extreme, even air surrounding the nozzle could be considered an insulating coating.

Hanse never discusses the insulating nature of the sleeve, and no evidence exists to show the sleeve is a coating. The term, “insulating coating,” should be given the meaning intended by the specification and claims. For example, the present application incorporates by reference U.S. patent application No. 09/719848 (now US 6,380,114 to

Brandy). Brandy describes forming an insulating coating from a suspension, and contrasts this coating from ceramic plates or papers. See Brandy, col. 1, lines 38-50.

Applicants have defined their terms using the common meaning of the word. The Examiner may not torture the intended and common meaning of the term, "insulating coating," in order to sustain her rejection of claim 1.

Even assuming the slag-line sleeve is an insulating coating, the sleeve does not substantially cover the first outer surface of the nozzle as required by claim 1 of the present application. Hanse does not show or describe a slag-line sleeve substantially covering the first outer surface, and the Examiner has presented no evidence that a slag-line sleeve ever would. The very terminology, that is, slag-line sleeve, suggests a sleeve present only at a portion of the nozzle, namely the slag-line. In actual practice, slag-line sleeves do not substantially cover a first outer surface of a nozzle because such sleeves do not have sufficient thermal shock-resistance. See, e.g., US 5656192 to Lee, entitled "Immersed Metallurgical Pouring Nozzles" (explaining the compromise between corrosion- and thermal shock-resistances of a slag-line sleeve). A "sleeve" that substantially covered the outer surface of a nozzle would likely crack rendering the sleeve ineffective and permitting erosion of the nozzle.

Applicant also do not understand the Examiner's statement on page 2, paragraph 7 of her office action, which states, "Figures 1 and 6 show a nozzle, thin and curved." This statement is obtuse, seemingly irrelevant, and false. Figures 1 and 6 of Hanse show a straight nozzle and stopper rod, respectively. Furthermore, the claims of the present application do not require a thin, curved nozzle.

Claims 1 of the present application requires an insulating coating substantially covering a first outer surface thereby forming a second outer surface and a glaze covering at least a portion of the second outer surface. The slag-line sleeve of Hanse is not an insulating coating within the meaning of the present application and does not substantially cover a first outer surface. Hanse cannot anticipate claim 1.

2. Benson

The Examiner has rejected claim 1 as anticipated by US 5,370,370 to Benson. Benson claims a refractory article comprising a carbon-free liner. Benson also describes the use of a slag-line sleeve (16) covering only a portion of the outer surface. See Benson col. 6 lines 10-13.

The Examiner argues the sleeve (16) substantially covers the outer surface of the nozzle, thereby forming a second outer surface. This statement is clearly erroneous. The only figure of Benson shows the slag-line sleeve (16) covering only a portion of a first outer surface.

The Examiner's basis for reliance on Benson is substantially identical to that of Hanse. The same arguments provided in Hanse *supra* are equally valid here. Benson does not describe a insulating coating or a coating substantially covering a first outer surface, and cannot anticipate claim 1.

3. Yamamura

The Examiner has rejected claim 1 as anticipated by US 5,908,577 to Yamamura. Yamamura teaches a nozzle having a liner comprising 5-70% cordierite and 1-10% carbon. The liner is described as reducing alumina build-up during steel casting. The Examiner cites col. 9 lines 55-60 as inherently producing a glaze, but this citation only

describes firing a green body in a non-oxidative atmosphere and machining the fired product to form a submerged nozzle. Yamamura nowhere mentions a “glaze” or anything functioning as a glaze.

The Examiner has dismissed Applicants’ affidavit concerning Yamamura’s inability to produce a glaze. See, Affidavit of Benson. The affidavit was submitted in response to a previous office action and states, “Yamamura does not inherently produce a ‘glaze’ on the surface of the claimed nozzle.” The affidavit also denies knowledge of “any commercially available, carbon-containing refractory ceramic article … that inherently produces a ‘glaze’ on its outer surface when fired by a standard process.” Uncontroverted affidavits may be treated as true. See, *Western Water Management Inc. v. Brown*, 40 F.3d 105, 33 USPQ 2d 2014, 2016 (5th Cir. 1994).

Applicants believe the Examiner has impermissibly (1) shifted the burden of proof onto the Applicants and (2) required Applicants to prove a negative. First, a rejection of the present application requires the Examiner to present a *prima facie* case supported by factual evidence. This would require the Examiner to show Yamamura having all elements of the present invention, including a glaze. The Examiner has not done so. Yamamura only describes firing and machining the article. A glaze is not discussed or suggested anywhere in Yamamura. Second, Applicants have submitted an affidavit averring that Yamamura does not inherently produce a glaze. The Examiner claims to reject the affidavit because it did not show convincing evidence that Yamamura could not produce a glaze. In fact, no evidence can exist. Logic prevents the proof of a negative. The Affiant is not aware of any commercially produced refractory product, including Yamamura, which inherently produces a glaze upon firing.

Yamamura does not describe a glaze in the claimed nozzle. Applicants have submitted an affidavit stating that Yamamura, like all standard commercial products, does not inherently produce a glaze. The Examiner has no evidence that Yamamura produces a glaze and sworn evidence that Yamamura does not produce a glaze. The Examiner must accept the truth of the affidavit. Absent a glaze, Yamamura lacks at least one element of claim 1 and cannot anticipate the present invention.

Applicants also maintain Yamamura does not include an insulating coating as required by the present application. The arguments against Hanse *supra* are valid against Yamamura.

SECTION 103 REJECTIONS

The Examiner raises various objections based on Hanse, Benson, Yamamura in combination with WO 99/65842 to Brandy. The rejections are substantially the same. Brandy corresponds to US 6380114 and issued from US Patent Application No. 09/719848, which was incorporated by reference in the present application.

A *prima facie* case of obviousness exists only when the Examiner provides:

1. one or more references;
2. that were available to the inventor;
3. that teach;
4. a suggestion to combine or modify the references;
5. the combination or modification of which would appear sufficient to have made the claimed invention obvious to one of ordinary skill in the art.

The Examiner combines Brandy with the remaining references but never explains how such combinations would teach the configuration of the present invention.

In an interview with the Examiner earlier in the prosecution of this application, Applicants provided sample articles, including samples of the prior art and the present invention. A unique feature of the present invention includes a glaze over an insulating

coating. Prior art glazed under an insulating coating. Brandy in combination with any of the other references does not teach or suggest glazing over an insulating coating. The Examiner bears the initial burden of proving obviousness. "The Examiner cannot sit mum, leaving the applicant to shoot arrows in the dark hoping to somehow hit a secret objection harbored by the examiner." *In re Oetiker*, 977 F.2d 1443, 24 USPQ 2d 1443, 1447 (Fed. Cir. 1992) (Plager, J., concurring).

4. Brandy in combination with any one of Hanse, Benson, or Yamamura

The Examiner has rejected claims 5 as obvious over Brandy in combination with any one of Hanse, Benson or Yamamura. Claim 5 depends from claim 1 and is patentable as a dependent claim of an allowable claim. Claim 5 is also independently patentable because the combination of the cited references does not show all elements of the present invention.

Applicants acknowledge Brandy comprises an insulating coating as meant by the present invention. In fact, Vesuvius Crucible Company is the assignee of both inventions. The present specification describes the prior art, which includes Brandy, as glazing a refractory article and then top coating with the insulating coating. This led to failure of the coating.

The present invention overcomes this problem by glazing over the insulating coating. The Examiner viewed the results for herself at the interview. Neither Hanse nor Benson nor Yamamura teach a glaze substantially covering a first outer surface that is coated with an insulating coating. Brandy teaches a composition for an insulating coating and does not teach coating over the insulating coating.

The Examiner has cited separate references that include a carbon-containing refractory body, an insulating coating and a glaze. She has not cited any teaching that places these elements in the configuration claimed by the present application, that is, the insulating coating substantially covering the body and the glaze covering at least a portion of the insulating coating. “Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching suggestion or incentive supporting the combination.” *In re Geiger*, 815 F.2d 686, 2USPQ 2d 1276, 1278 (Fed. Cir. 1987). “When the incentive to combine the teachings of the references is not readily apparent, it is the duty of the examiner to explain why combination of the reference teachings is proper …Absent such reasons or incentives, the teachings of the references are not combinable.” *Ex parte Skinner*, 2 USPQ 2d 1788, 1790 (B.P.A.I. 1987).

None of the references describes the problem, which the present application has identified and solved, namely pin-holing and delamination of glaze under an insulating coating. The references may include certain elements of the present application, but “[i]t is impermissible to use the claimed invention as an instruction manual or ‘template’ to piece together the teachings of the prior art so that the claimed invention is rendered obvious.” *In re Fritch*, 972 F.2d 1260, 23 USPQ 2d 1780, 1784 (Fed. Cir. 1992) (quoting *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ 2d 1596, 1600 (Fed. Cir. 1988). Prior art does not teach or suggest combining the elements as taught in claim 5. Claim 5 is not obvious and Applicants request allowance of claim 5.

5. Benson in combination with Brandy

The Examiner has rejected claim 19 as unpatentable over Brandy in combination with any one of Hanse, Benson or Yamamura. The arguments for the patentability of claim 5 are equally valid for claim 19. The Examiner's reference to claim 24 in her rejection of claims 19-23 based on Hanse and Brandy, see page 5 line 6, is unclear.

The Examiner cites page 1, lines 1-20 of Brandy for support that the composition of Brandy may be used for a "sleeve." Applicants believe the Examiner has misunderstood Brandy. Brandy refers only to a sleeve of a stopper rod. See page 1, line 15. A stopper rod sleeve covers the nose of a stopper during preheating. It is not analogous, in form or function, to a slag-line sleeve of a nozzle. A stopper "sleeve" is typically dome-like and comprises an insulating material, such as a ceramic fiber blanket or insulating coating. A stopper "sleeve" is friable and fungible so that, during casting, the stopper may seat properly against a well nozzle. In contrast, a nozzle "sleeve" is cylindrical and is often a pressed refractory piece comprising an erosion-resistant material such as zirconia. The nozzle sleeve is intended to last the duration of a cast and resist attack by caustic slag.

The insulating coating of Brandy would not be used as a slag-line sleeve for a nozzle. The insulating coating is even more susceptible to erosion than a carbon-bonded refractory body. The Examiner should remember that the insulating coating of Brandy, as displayed in the previous personal interview, was friable, could be scratched with a fingernail, and pulled apart with one's fingers. Such a composition could not withstand the rigors required of a slag-line sleeve during the continuous casting of molten metal.

Claim 19 teaches a combination, which solves a problem of the prior art. The references do not teach or suggest this combination. The Examiner has cited references

having various elements of the combination, but has not cited any teaching to combine the elements as claimed by the present invention. The references do not render obvious claim 19.

UNSUPPORTED REJECTION

6. Claim 4

The Examiner has not identified any basis of rejection for claim 4 nor has she cited any prior art against the claim. As such, the claim should be allowed.

CONCLUSION

In light of the above, Applicants respectfully submit claims 1-6 and 19-24 are patentable over the prior art and requests favorable action on this appeal for all issues.

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Respectfully submitted,



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Appendix – Pending Claims

1. A refractory article for use in the casting of molten metal comprising a carbon-containing refractory piece having a first outer surface, an insulating coating substantially covering the entire first outer surface thereby forming a second outer surface, and a glaze covering at least a portion of the second outer surface.
2. The refractory article of claim 1, wherein the refractory piece comprises a carbon-bonded refractory composition.
3. The refractory article of claim 1, wherein the refractory piece comprises a nozzle.
4. The refractory article of claim 3, wherein the nozzle comprises a thin-slab nozzle.
5. The refractory article of claim 1, wherein the insulating coating is made from an aqueous suspension comprising 20-80 wt.% ceramic matrix, 5-40 wt.% insulating microspheres, 0.5-15 wt.% one or more binders, 5-20 wt.% of a metal capable of melting under preheat conditions, and up to 25 wt.% water.
6. The refractory article of claim 1, wherein the glaze comprises a composition resistant to oxygen diffusion.

7-18. (canceled)

19. A refractory article for use in the casting of molten metal comprising:
 - a) a carbon-containing refractory piece having a first outer surface;
 - b) an insulating coating comprising insulating microspheres and covering at least a portion of the first outer surface thereby forming a second outer surface; and
 - c) a glaze covering at least a portion of the second outer surface.
20. The refractory article of claim 19, wherein the refractory piece comprises a carbon-bonded refractory composition.

21. The refractory article of claim 19, wherein the refractory piece comprises a nozzle.
22. The refractory article of claim 1, wherein the insulating coating is made from an aqueous suspension comprising 20-80 wt.% ceramic matrix, 5-40 wt.% insulating microspheres, 0.5-15 wt.% one or more binders, 5-20 wt.% of a metal capable of melting under preheat conditions, and up to 25 wt.% water.
23. The refractory article of claim 19, wherein the glaze comprises a composition resistant to oxygen diffusion.
24. A refractory article comprising a carbon-containing refractory piece having an interior surface defining a bore for flowing molten metal therethrough and a first outer surface, an insulating coating substantially covering the entire first outer surface thereby forming a second outer surface, and a glaze covering at least a portion of the second outer surface.